

Great Lakes HABs Collaboratory Aims for Collective Impact on HABs

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Binational collaboration

The Laurentian Great Lakes consist of five interconnected lakes that form the largest group of freshwater lakes on Earth and contain one-fifth of the world's surface freshwater. Eight U.S. states and one Canadian province rely upon the Great Lakes for business, recreation, and drinking water. Being an important asset to the region, protecting the Great Lakes ecosystem is a high priority. One issue that is currently threatening the water quality of the Great Lakes is summer Harmful Algal Blooms (HABs), which can produce toxins harmful to humans and animals. HABs are not a new issue for the Great Lakes: during the 1950s-'60s HABs were an annual occurrence in Lake Erie. After the adoption of the binational Great Lakes Water Quality agreement in 1972 and attendant reductions in phosphorus (P) entering the lake, water quality started to rebound in Lake Erie. However, beginning in the early 2000s, Lake Erie and other parts of the Great Lakes started experiencing renewed occurrences of HABs.

Along with a recurrence of HABs, there has been an increase in research to help understand what causes or influences HABs and how we can prevent, manage, or respond to them. HAB research on the Great Lakes spans from studies conducted on agricultural and urban lands to studies out in the lakes. Research institutions are also spread across the Great Lakes basin. Since research spans multiple disciplines and geographic areas, communication between research groups can be difficult. To help facilitate this communication, the Great Lakes HABs Collaboratory was formed to provide a "collective laboratory" that enables science-based information sharing among scientists



and also between scientists and decision makers. Founded by the Great Lakes Commission (GLC) and the United States Geological Survey Great Lakes Science Center (USGS-GLSC), the HABs Collaboratory brings scientists together through webinars, in-person meetings, and topical subgroups. Through these activities, scientists are able to share the latest research efforts and findings while also building consensus on issues related to HABs.

The HABs Collaboratory follows the "Collective Impact" model (Kania and Kramer 2011), where individuals from a variety of different groups come together to solve a specific problem and are supported by a neutral backbone organization. The Great Lakes Commission serves as the backbone organization for the HABs Collaboratory, enabling communications through an e-mail listserv, webinars, conference calls, and online topical group forums – all of which allow members of the HABs collaborators to share information using different means with different audiences. Currently, there are 170 researchers and practitioners on the HABs Collaboratory list serv. Anyone on the list can participate in the webinars, share information via the listserv or initiate or join topical subgroups.

Sharing science among scientists

Webinars allow researchers to easily share the latest HAB science with members of the HABs Collaboratory across the binational Great Lakes region and beyond. During the summer of 2016, the HABs Collaboratory hosted the "State of the Science" webinar series, which consisted of eight one-hour webinars on a variety of topics related to HABs. Presenters were given five minutes to present a quick summary of their research. The quick presentation format enabled viewers to hear an overview of a variety of research projects conducted by 45 different researchers.

After the "State of the Science" series, the HABs Collaboratory hosted a series of more in-depth webinars that allowed viewers to learn more about select topics discussed during the "State of the Science" series. The first in depth webinar was the "End of Field Season Wrap-up" webinar that gave an update on 2016 bloom conditions across the Great Lakes. Presenters discussed summer time HABs in four different Great Lakes. During the webinar, presenters informed viewers about mild bloom conditions in Lake Erie, an average bloom size in Saginaw Bay, an intense bloom in Sandusky Bay, and an unexpected bloom in Lake Superior. For the next in-depth webinar, the HABs Collaboratory teamed up with the Invasive Mussels Collaborative, another GLC-administered group focused on advancing scientifically sound technology for invasive mussel control to produce measurable ecological and economic benefits, to host a webinar exploring the interactions between HABs and invasive mussels. In March, the HABs Collaboratory hosted a webinar on Great Lakes hydrodynamic models, which focused on highlighting current

hydrodynamic models used for HABs and also describe other models that are suitable for modelling HABs.

Building consensus; communicating science beyond researchers

HABs Collaboratory subgroups focus on building scientific consensus around important areas of HAB research. Currently, these subgroups are focusing on: sources of nutrients; toxicity of HABs; and the role of nitrogen in HAB formation. More than 30 researchers from across the Great Lakes have been participating in regular group calls. As these groups work to build consensus around these topics, they will summarize the scientific knowledge of HABs, which will be reflected in documents or other products that can be easily understood by those who are not scientists but who are working in other ways to address HABs issues.

The HABs Collaboratory also hosts in-person events to enable interaction

among researchers and practitioners including managers and science communicators. A kick-off meeting for the HABs Collaboratory was held at NOAA-Great Lakes Environmental Research Laboratory in December of 2015. During the kick-off meeting, more than 60 members gathered together to share research, ideas, and information needs. The meeting also helped determine how the HABs Collaboratory could best serve its members. A second in-person meeting of the HABs Collaboratory took place May 15th, 2017, where members to shared progress on the latest research and developed priorities for the coming year (Figure 1). At the 2017 International Association of Great Lakes Research (IAGLR) conference in May, 2017 which drew more than 1,000 researchers, managers and practitioners, the HABs Collaboratory hosted a day-long session titled “Harmful Algal Blooms from watershed influence to ecosystem effects” that featured more than 16 presentations

on the latest science related to HABs in the Great Lakes and other freshwater systems.

Overall, the HABs Collaboratory provides a unique opportunity for researchers to interact with other researchers from a variety of disciplines and institutions and to facilitate the use of scientific information to support relevant decisions by managers and practitioners. Frequent webinars and conference calls allow researchers from across the Great Lakes to interact on a regular basis. The researchers are able to work together to share the latest results from HAB projects and to develop synthesis products. For more information, go to glc.org/work/habs-collaboratory.

Reference

Kania, J. and Kramer, M. 2011. Collective Impact. *Stanford Social Innovation Review*, Winter 2011: 36-41



Figure 1. Members of the HABs Collaboratory gather in Ann Arbor, MI, at NOAA-Great Lakes Environmental Research Laboratory for an in-person meeting.

Ken Gibbons is the 2016 Great Lakes Commission Fellow. Ken assists the Commission with a range of water quality projects, including HABS Collaboratory and ErieStat (a program that is developing an online information delivery system to track trends in phosphorus loading to Lake Erie). Prior to joining the Commission, Ken studied harmful algal blooms in Lake Erie, specifically investigating internal loading of phosphorus.



Victoria Pebbles is a program director with the Great Lakes Commission where she manages and facilitates multidisciplinary project teams to analyze information, build consensus and develop policy solutions to address complex ecological and related socioeconomic issues, including clean energy, climate change, water resource management, habitat conservation, land use, and coastal management. She has published dozens of articles and technical reports, delivered copious presentations, and served on and facilitated numerous multi-stakeholder project teams and task forces. Before joining the Commission in 1993, Ms. Pebbles held positions with the University of Michigan, the U.S. Senate, and the U.S. Environmental Protection Agency. 🐦



(Favot et al., continued from p. 31 . . .)

cyanobacterial bloom-affected Ontario lakes into a historical context using paleolimnological techniques.

Kathleen Rühland is a research scientist at PEARL (Queen's University) whose work focuses on using diatoms as environmental indicators to understand spatial and temporal trends in climatic and environmental change. Her research spans many geographic regions and covers various time scales, but has centered largely on human-induced impacts of the past century.



Andrew Paterson is a research scientist with the Ontario Ministry of the Environment and Climate Change. Working at the Dorset Environmental Science Centre (DESC), located in the heart of Ontario's cottage country, Andrew carries out research on the effects of multiple environmental stressors on the water quality and ecology of inland lakes.



John Smol is a professor of biology at Queen's University (Kingston, Ontario), where he also

holds the Canada Research Chair in Environmental Change. Smol founded and co-directs the Paleocological Environmental Assessment and Research Lab (PEARL), a group of ~40 students and other scientists dedicated to the study of long-term global environmental change, and especially as it relates to lake ecosystems. John has authored over 500 journal publications and chapters since 1980, as well as completed 21 books. 🐦

